

## Proceedings of the New York Entomological Society

(Meetings held in Room 129 of the American Museum of Natural History  
unless otherwise indicated.)

### Meeting of October 7, 1969

President David Miller presided; 16 members and 7 guests were present. Dr. John Cooke, formerly of Oxford University was introduced to the members of the Society. Dr. Cooke is an arachnologist on the staff of the American Museum of Natural History. Proposed for Active Membership were: Mrs. MaryAnn Karpel of Mt. Kisco, New York whose interest is insect pathology and Miss Joan Todd of New York City. Proposed for Student Membership was Mr. Guillermo Alvarado, a student in the Department of Entomology at the University of California at Davis who is interested in arachnids.

**PROGRAM. Scanning Electron Microscopy and its Application in Entomology.** Mr. Frederick Miller, Jr. discussed the history and operation of the scanning microscope. By using prepared and living specimens of lice and fleas, Mr. Miller demonstrated the surface detail that can be achieved by using this instrument. (An abstract follows.)

The meeting was adjourned at 9:15 P.M.

HOWARD TOPOFF, *Sec.*

### SCANNING ELECTRON MICROSCOPY AND ITS APPLICATION IN ENTOMOLOGY

The initial concept of the scanning electron microscope may be attributed to Knoll in 1935. Thirty years later the first commercial scanning electron microscope became available. It has rapidly become a valuable tool in entomology. Morphologists and physiologists are now able to study fine surface details in relationship to other structures as well as the surface as a whole, at higher magnification and greater depth of field than with the light microscope. Taxonomists enjoy the ease of counting and measuring the various setae and plates. Evolutionists are able to see minute structural changes in species, which will eventually lead to a better understanding of their phylogenetic relationships.

Although the specimens are usually cemented to the specimen stub and coated with approximately 200Å. of gold, or some other metal, uncoated and even live material may be studied under some conditions.

Studies of the antennal structures of the Anoplura show the "ring sensorium" described by Ferris (1951) on the fourth and fifth segments to be sensilla coeloconica. The pegs at the base of the sensilla have numerous projections protruding from their apex. The number and size of these projections have been found to vary from species to species. The openings of the sensilla coeloconica also vary in size from species to species. When no sensilla coeloconica are present, sensilla basiconica are located in their place. The apices of the stalks of the sensilla basiconica have numerous projections which vary in size from species to species. Two pore organs are usually found close to the sensilla on the fifth or terminal segment. The stalks appear capable of retracting into the segments; Because: the pegs of the two types of sensilla are similar; the sensilla basiconica are present when the sensilla coeloconica are not; the two structures are found in the same antennal locations; and the smaller sensilla coeloconica openings have two pore-like organs close to them which are similar to the pore organs of those seen near the sensilla basiconica, it seems that one sensilla is a modification of the other. There is evidence that the phylogenetic relationships

of the Anoplura may be evaluated by using these sensilla and their modifications. Studies of this possibility are currently in progress.

FREDERICK MILLER, JR.

### Meeting of October 21, 1969

President David Miller presided; 20 members and 8 guests were present. Elected to Active Membership were Dr. MaryAnn Karpel and Miss Joan Todd. Mr. Guillermo Alvarado was elected to Student Membership. Proposed for Active Membership was Mr. Edward Konig of the Bronx, New York. Dr. Miller announced that the New York Entomological Society sent a donation last spring to the Zoological Record in support of their publication which abstracts and indexes literature published in biological journals. The Society has received a letter of appreciation for its donation. Dr. Miller announced that the nominating committee consists of Dr. Elsie Klots, Mr. Bernard Heineman and Dr. James Forbes. The President also announced that Dr. Kumar Krishna and Mrs. Valerie Krishna were appointed as Editors of the Society's publication ENTOMOLOGICA AMERICANA.

PROGRAM. **Biological Control of Aphids.** Father Daniel Sullivan of Fordham University discussed the various methods used in controlling insect pests and stressed the use of entomophagous insects in controlling aphids. (An abstract follows.)

The meeting was adjourned at 9:20 P.M.

HOWARD TOPOFF, *Sec.*

### BIOLOGICAL CONTROL OF APHIDS

A fairly safe prediction is that the problem of man and the contamination of his environment will be the focus of world concern during the 'seventies. In the area of insect pest control, however, banning of DDT and other insecticides is often a negative approach and imaginative alternatives must be found to complement—if not replace chemical control.

Biological control is such an alternative, based on principles which try to restore the predator-prey, parasite-host relationships as they exist in nature. This usually involves determining the original country from which the insect pest was "imported" and then searching for its natural enemies. These are then introduced and colonized in the host country in an attempt to re-establish the original balance of nature.

Aphids are economically important insect pests throughout the temperate regions of the world on agricultural crops, ornamental plants, and trees. The use of predators such as ladybird beetles to control aphids is well-known, but the existence of tiny wasps (Order Hymenoptera, Families Aphidiidae and Aphelinidae) is frequently overlooked.

These parasitic wasps are specific in attacking certain species of aphids. The female wasp lays an egg inside an aphid, and after hatching—the endoparasitic larva gradually devours and kills the host aphid, over a period of 8 days. The wasp larva spins a cocoon inside the dead aphid (now called a "mummy") and also pupates there. Four days later (or about 12 days from the time the egg was originally deposited)—an adult wasp emerges from the mummy, ready to mate, and repeat the cycle.

In nature other wasps (called secondary parasites or *hyperparasites*) attack the first wasp (or primary parasite) while it is still developing inside and devouring the original host aphid.

DANIEL SULLIVAN

**November 4, 1969—Election Day—No Meeting****Meeting of November 18, 1969**

President David Miller presided; 16 members and 8 guests were present. Mr. Edward Konig was elected to Active Membership. Proposed for Active Membership were: Mrs. Adrian DeWind of New York, N.Y.; Dr. William Gotwald of Utica, New York and Dr. J. E. McPherson of Carbondale, Illinois. Mr. Joseph S. Butsko was proposed for Student Membership.

**PROGRAM: Insect Collecting in Central America.** Mr. Ginter Ekis of Rutgers University spoke of his experiences in Central America and showed slides of various plants and animals he encountered.

The meeting was adjourned at 9:20 P.M.

LEE H. HERMAN, *Sec. pro. tem.*

**Meeting of December 2, 1969**

President David Miller presided; 20 members and 11 guests were present. Mr. Edwin Sexton of Middletown, New Jersey was proposed for Active Membership. Mr. Sexton is interested in stored-product entomology and pesticides.

Miss Nora Churns was proposed for Student Membership. Miss Churns is a student at City College and is interested in entomology in general. President Miller introduced the retiring president of the Jr. Entomological Society, Mr. Jamin Eisenbach. Mr. Eisenbach discussed the Jr. Society's summer field trip to the American Museum of Natural History's Southwestern Research Station in Arizona. Mr. Raymond Mendez, a former member of the Jr. Society and presently a Scientific Assistant in the Department of Entomology at the American Museum of Natural History, showed slides of insects and plants from the Southwestern Research Station.

Dr. Miller informed the Society that a road was proposed by the Tri-State Highway Commission, to be built through the Ward Pound Ridge Reservation. Last spring the New York Entomological Society sent a letter to the Tri-State Commission asking that they reconsider the route of this proposed road so that it would by-pass the Reservation. The Society also sent letters to other entomological societies asking for their support. The New York Entomological Society has received a letter from the Connecticut Society, supporting our proposal and noting that they had sent their own letters of protest to the highway agency concerned.

**PROGRAM. Communication in Army Ants.** Dr. Howard Topoff discussed trail-following behavior and its development in army ants in relation to social organization. (An abstract follows.)

**COMMUNICATION IN ARMY ANTS**

Army ant colonies exhibit cyclic behavior, consisting of nomadic and statary phases which alternate throughout the functional season. For *Neivamyrmex nigrescens* in southeastern Arizona, cyclic activities are conducted from April through September.

The nomadic phase of *N. nigrescens* is characterized by high colony activity, exhibited by strong raids and nightly emigrations to new nesting sites. This phase is initiated by stimula-



tion, both chemical and chemotactual, imparted to the adult workers by a newly eclosed callow brood. Although the callows emigrate with the colony on the first nomadic night, they do not participate in raiding activities. Since army ants raid and emigrate on a chemical trail laid down continuously from their hind-guts, experiments were designed to compare the sensitivity of adult and callow workers to the chemical trail.

An artificial trail was produced by killing 200 intermediate-sized adult ants in 10cc. of petroleum ether. The ants were then discarded and the ether used as a stock solution of trail substance. This solution was put into a microburette, suspended above a rotating phonograph turntable. In this way, a circle of trail substance was deposited onto a filter paper disc positioned on the turntable. Ants were placed on the filter paper, and allowed to cross the trail. If an ant followed the circular trail for one-half circle (180 degrees), it was considered to have followed the trail.

When adult and immature (callow) ant workers were tested on this artificial trail, the callows were found to be more sensitive than adults. This was indicated by the fact that a greater percentage of callows could follow the trail substance than adult workers from the same colony.

It is difficult to explain why callow workers do not participate in raiding activities during the first few days of the nomadic phase, since they are as sensitive or more sensitive to the species chemical trail than are adult ants. Perhaps the callows are also more sensitive to other chemical and tactual stimulation that is characteristically present in army ant nests. One hypothesis is that callow army ants remain in the nest during raiding, because their threshold for chemical and tactual stimulation is very low, and that they leave the nest to emigrate when this stimulation is reduced. This reduction in stimulation might take place when the adult ants leave the nest during an emigration.

HOWARD TOPOFF

### Meeting of December 16, 1969

Vice-president Herman presided; 23 members and 24 guests were present. Mr. Edward Sexton of Middletown, New Jersey was elected to Active Membership and Miss Nora Churns of City College was elected to Student Membership. President Miller announced that the 14th International Congress of Entomology will be held in 1972 in Canberra, Australia. Anyone seeking information should see Dr. Miller.

PROGRAM. **Living Insect Photography: Methods and Examples.** Dr. Alexander B. Klots explained the operation of photographic equipment and its application to insect photography.

The meeting was adjourned at 9:20 P.M.

MICHAEL BOSHES, *Sec. pro. tem.*

### Meeting of January 6, 1970—The Annual Meeting

President David Miller presided; 15 members and 23 guests were present. Mr. Buckbee, reporting for the Publication Committee announced the resumption of publication of **Entomologica Americana**, following our consolidation with the Brooklyn Entomological Society. The first copy of **Entomologica Americana** was presented to President Miller in appreciation of his efforts as President of the Society.

On behalf of the Nominating Committee, Mr. Heineman presented the list of candidates for the year 1970:

President—Dr. Lee H. Herman, Jr.  
 Vice-president—Dr. Howard R. Topoff  
 Secretary—Fr. Daniel J. Sullivan, S. J.  
 Assistant Secretary—Miss Betty White  
 Treasurer—Dr. Winifred Trakimas  
 Assistant Treasurer—Mrs. Patricia Vaurie  
 Trustees: Dr. David C. Miller, Dr. James Forbes  
 Publication Committee: Dr. Lucy Clausen, Chairman  
                                   Dr. Alexander B. Klots  
                                   Dr. Ayodyha P. Gupta

A motion was made and seconded that the candidates be elected. The entire slate was unanimously elected to office. After the election, President Lee Herman presided.

Miss Helen McCarthy of Astoria, New York, and Mr. Walter Kaufman of Jamaica New York were proposed for Active Membership.

PROGRAM. **Semi species of *Drosophila paulistorum*.** Dr. Theodosius Dobhansky of Rockefeller University, discussed the occurrence of hybrid species of *Drosophila* in Central and South America and experiments with artificial selection in the laboratory.

The meeting was adjourned at 9:40 P.M.

DANIEL J. SULLIVAN, S.J., Sec.

### Meeting of January 20, 1970

President Lee Herman presided; 15 members and 8 guests were present. President Herman announced that Dr. Lucy Clausen has accepted the Editorship of the Society's **Journal**. This creates a vacancy on the Publication Committee which will be filled by Dr. John Cooke. Miss Helen McCarthy of Astoria, New York and Mr. Walter Kaufman of Jamaica, New York were elected to Active Membership.

Miss Helen Claire Saraceni of Mt. Vernon, New York and Hunter College was proposed for Student Membership.

PROGRAM. **Recently Discovered Associations Between Moths and Mites.** Dr. Asher Treat, Professor Emeritus of Biology at the City University of New York spoke of many relationships which exist between moths and mites.

The meeting was adjourned at 9:55 P.M.

DANIEL J. SULLIVAN, S.J., Sec.

### Meeting of February 3, 1970

President Lee Herman presided; 13 members and 6 guests were present. Miss Helen Claire Saraceni of Mt. Vernon, New York and Hunter College was elected to Student Membership. Mr. John A. Serrao of St. Francis College was proposed for Student Membership.

PROGRAM. **Part I—The Entomologist and Part II—Ants and Their Search for Food.** Dr. William H. Gotwald, Jr. of the Department of Biology of Utica College, Utica, New York, in Part I, gave a humorous and informative presentation of the type of work done by

a professional entomologist. In Part II his presentation was based upon his research on the feeding behavior of the carpenter ant—its search for food in the form of honeydew and as a scavenger. (An abstract follows.)

The meeting was adjourned at 9:30 P.M.

DANIEL J. SULLIVAN, S.J., Sec.

### ANTS AND THEIR SEARCH FOR FOOD

Metabolically, ants, similar to other animals, must procure adequate nutrients from which new protoplasm can be made. Complex patterns of food gathering have evolved in many species in response to these needs.

The food gathering behavior in a single colony of *Camponotus noveboracensis*, a carpenter ant, was presented. The colony had three food sources: the honeydew produced by the treehopper *Vanduzeeia arquata*; the sap exudate from a wound in the trunk of the common lilac *Syringa vulgaris* and dead insects. The behavior of the worker ants in seeking these sources was discussed.

Because this ant uses several food sources it is regarded as a generalized feeder. It can utilize several alternative foods and is able to adapt to changing food resources.

WILLIAM H. GOTWALD

### Meeting of February 17, 1970

President Lee Herman presided; 15 members and 5 guests were present. Mr. John A. Serrao of St. Francis College was elected to Student Membership.

Dr. John A. Cooke of the American Museum of Natural History and Dr. Robert C. Dalglish of Union College, Schenectady, New York were proposed for Active Membership.

**PROGRAM. Transmission of Viruses by the Red-Banded Leaf Roller.** Dr. Mary-Ann Karpel of Rutgers University, New Brunswick, New Jersey explained that her research began with the problem of developing a medium for the mass rearing of the Red-banded Leaf Roller, which could then be used for studies on the transmission of a virus. The virus is transmitted by both sexes via the sperm as well as the egg. (An abstract follows.)

The meeting was adjourned at 9:20 P.M.

DANIEL J. SULLIVAN, S.J., Sec.

### TRANSMISSION BY THE RED-BANDED LEAF ROLLER

Indications of the occurrence of transovarial transmission were noted in colonies of red-banded leaf rollers (*Argyrotaenia velutinana*, Walker) being reared for the purpose of mass-producing a granulosis virus. Lengthened incubation time, low hatch rates, and discoloration of eggs laid by adults derived from infected larvae were noted.

Fewer pupae and adults were obtained from infected larval populations than from healthy larval populations. Selection pressure appeared to be heavier against females than against males, with females dying earlier and in greater numbers than males.

Eggs derived from infected females, both before and after fertilization with sperm from infected males, were studied with the electron microscope for the presence of whole virus



granules. No evidence of the presence of whole virus granules, on or within the eggs, was found.

Transmission experiments, involving matings with infected males and infected females, infected males and healthy females, and healthy males and infected females, indicated that the virus was transmitted by the male as well as by the female. Apparently, some or all of the viral genome, rather than the whole granule, was transmitted.

Nucleic acids were extracted from the granulosis virus, the infected eggs and the healthy eggs. These extracts were studied with the aid of sucrose gradients, ultracentrifugation, and spectrophotometry. The nucleic acid profiles differed for healthy and infected eggs. It is theorized that the viral genome attaches to the host genome in one or several places.

MARY-ANN KARPEL

### Meeting of March 3, 1970

Vice-President Howard Topoff presided; 16 members and 11 guests were present. Dr. John A. Cooke of the American Museum of Natural History and Dr. Robert C. Dalgleish of Union College, Schenectady, New York were elected to Active Membership.

Mr. Herbert Sullivan was proposed for Active Membership.

PROGRAM. **Ecological Problems of the Proposed Sea Level Canal in Central America.** Dr. Charles Lacaille of St. John's University, Jamaica, New York presented a history of the present canal through Panama, with special emphasis on the various diseases which hindered the construction of the canal. The ecology and epidemiology of malaria were discussed and the current aspect of research being done in the Canal Zone. The second part of his talk centered on the ecological studies being undertaken to determine what impact the proposed sea-level canal through Colombia may have on the flora and fauna of the area. The Meeting was adjourned at 9:40 P.M.

DANIEL J. SULLIVAN, S.J., Sec.

### Meeting of March 17, 1970

President Lee Herman presided; 25 members and 16 guests were present. Mr. Herbert Sullivan was elected to Active Membership.

PROGRAM. **Mating Behavior of Cockroaches.** Dr. Louis Roth of the U.S. Army Natick Laboratory, Natick, Massachusetts, demonstrated the behavioral postures involved in the mating of *Nauphoeta cinerea* by both a color motion picture and slides. Their behavior was compared with other species, and the question of what controls the inhibition of egg development after the transfer of the spermatophore was discussed. It was Dr. Roth's position that this inhibition is probably due to mechanical rather than hormonal influence. (An abstract follows.)

The meeting was adjourned at 9:15 P.M.

DANIEL J. SULLIVAN, S.J., Sec.

### MATING BEHAVIOR OF COCKROACHES

Olfactory, tactile, and contact chemoreceptive stimuli are principally responsible for patterns of behavior during courtship and mating of cockroaches. The corpora allata control the production of female sex pheromone in several species of Blatteria. In males of *Nauphoeta*

*cinerea*, a pheromone (seducin) is produced on the tergites which induce the female to mount and palpate his dorsum. The female's position above the male apparently is detected by pairs of abdominal vibration receptors found in each abdominal segment.

The firm insertion of the spermatophore in the bursa copulatrix results in mechanical stimuli which are transmitted to the brain, and the female thereafter does not respond to the male's pheromone; she will not mate again until after parturition. Transecting the nerve cord prior to or just after copulation, results in hypersexual female behavior, apparently because the inhibitory signals from the bursa cannot reach the brain.

During pregnancy the ovarian oocytes do not develop because the ootheca in the uterus inhibits the activity of the allata. There is experimental evidence to substantiate that this inhibition is due to mechanical stimuli resulting from the stretched uterus.

LOUIS M. ROTH

### Meeting of April 7, 1970

President Lee Herman presided; 16 members and 6 guests were present. Dr. Herman announced that Mr. Frederick Miller has been appointed a Trustee of the Society.

Mrs. Monica Topoff was proposed for Active Membership.

PROGRAM. **Transmission of Tumors by Insects.** Dr. Paul Woke of the American University, Washington, D.C. indicated that blood sucking insects such as mosquitoes and fleas could be the vectors of virus-induced neoplasms. The presence of similar tumors in domestic animals and house pets makes continued research in this area important in determining a possible relationship with human tumors and the role of insects as vectors. (An abstract follows.)

The meeting was adjourned at 9:25 P.M.

DANIEL J. SULLIVAN, S.J., Sec.

### TRANSMISSION OF TUMORS BY INSECTS

Tumors (Neoplasms: Galls, warts, cancers, leukemias) are abnormal growths of tissue occurring as diseases in many different kinds of plants, lower animals, and man. Insects are known to be capable of transmitting several tumor-inducing agents between animals. Certain virus-induced benign and malignant tumors of wild rabbits are transmissible from rabbit to rabbit by mosquitoes, conenose bugs, and fleas. Tumor cells in ingested blood from hamsters are apparently transmissible by mosquitoes and biting flies. Question: Are insects, ticks, and mites (arthropods) more significantly involved in the causation and/or transmission of tumors, particularly leukemias, than is known at present?

Arthropods have ample opportunities to acquire potentially infectious agents from tumor-bearing animals, to harbour these agents and to transmit and discharge them into recipients. While the animal body does resist such intrusions, tumors have developed following transmission, as in known communicable but non-tumorous diseases.

The feeding behavior of arthropods in nature is suited to natural transmission of tumors; the sources of the inducing agents are readily accessible.

Reports in the literature on space, time, seasonal and associational relationships in leukemia cases often suggest insect transmission.

The insect-host relationship is often such that insects might induce tumors directly.



Our research is currently concerned with the mechanics of blood ingestion by arthropods in relation to the acquiring from tumorous hosts and the transfer to new hosts of causative agents, and the survival of these agents within the arthropod.

If tumors or leukemias of man's domesticated and economic animals or of man himself should be found to be transmissible by arthropods a further degree of control would be possible.

Arthropods as possible causative and transmitting agents should be taken into account along with other environmental factors in epidemiological investigations of tumor, particularly leukemia, cases.

PAUL A. WOKE

### Meeting of April 21, 1970

President Lee Herman presided; 17 members and 6 guests were present. Mrs. Monica Hunt Topoff was elected to Active Membership. Dr. A. Dexter Hinckley of the Brookhaven National Laboratories, and Dr. Donald E. Etes of Park Forest, Illinois were proposed for Active Membership. Mr. Edward A. Martinko of Colorado University was proposed for Student Membership.

PROGRAM. Dr. Howard Topoff explained that the "Tribute to Dr. Theodore C. Schneirla," planned for this evening was cancelled because of the Passover Festival. It will be rescheduled for next fall. Dr. Topoff spoke on his **1965 Trip to Costa Rica**. Sponsored by the National Science Foundation, and in cooperation with various American Universities, a group of professors and students studied tropical ecology from the point of view of varied disciplines such as botany, zoology, entomology, herpetology, etc. This summer course has been repeated in succeeding years and was highly praised also by several members in the audience who had personal knowledge of this program.

The meeting was adjourned at 9:15 P.M.

DANIEL J. SULLIVAN, *S.J.*, *Sec.*

### Meeting of May 5, 1970

President Lee Herman presided; 22 members and 7 guests were present. Mr. J. Huberman presented the report of the Auditing Committee. Dr. A. Dexter Hinckley of the Brookhaven National Laboratories and Dr. Donald E. Etes of Park Forest, Illinois were elected to Active Membership. Mr. Edward A. Martinko of Colorado University was elected to Student Membership.

PROGRAM. **Infestation and Survival of the Gypsy Moth.** Dr. A. Dexter Hinckley of the Brookhaven National Laboratories used color slides to demonstrate the infestations and capture of the gypsy moth. He also spoke of the various mortality factors that are involved. He briefly discussed other studies of radiation effects on plants and their insect fauna.

The meeting was adjourned at 9:30 P.M.

DANIEL J. SULLIVAN, *S.J.*, *Sec.*

### Meeting of May 19, 1970

President Lee Herman presided; 19 members and 5 guests were present.

PROGRAM. **Collecting Plants and Animals in New Guinea.** Dr. Hobart Van Deusen of the American Museum of Natural History, told of the background the Archbold Expeditions

to New Guinea which began in 1933. A color film, taken during the 7th expedition in 1964 showed the beautiful scenery of New Guinea, the methods of collecting and preparing botanical specimens and the capture and preparation of animal skins for the Museum's collection. Extra specimens were shared with other museums throughout the world. Dr. Van Deusen emphasized the fact that New Guinea is still in the early stages of exploration from a collector's point of view, and many years of work lie ahead.

Dr. Topoff announced that tonight's meeting was the last of the academic year and that we would resume our meetings in October.

The meeting was adjourned at 9:30 P.M.

DANIEL J. SULLIVAN, *S.J.*, *Sec.*